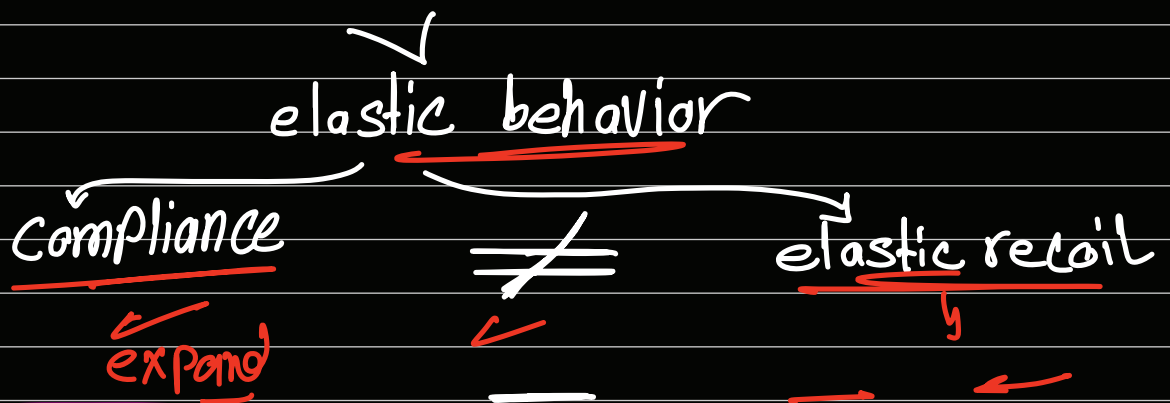


4)

* → Elastic behavior of lung

* → Surfactant

→ Elastic behavior :



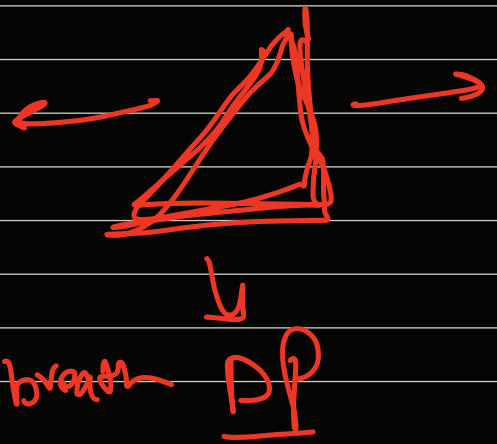
⇒ Compliance of lung → Change in lung volume
(ΔV) per unit change in transpulmonary pressure
(distending p) ΔP .

⇒ $C = \frac{\Delta V}{\Delta P}$

lung

⇒ index for expansion
dist

⇒ lung with compliance → easy to be inflated → work of breath ΔP



→ at the end of exp

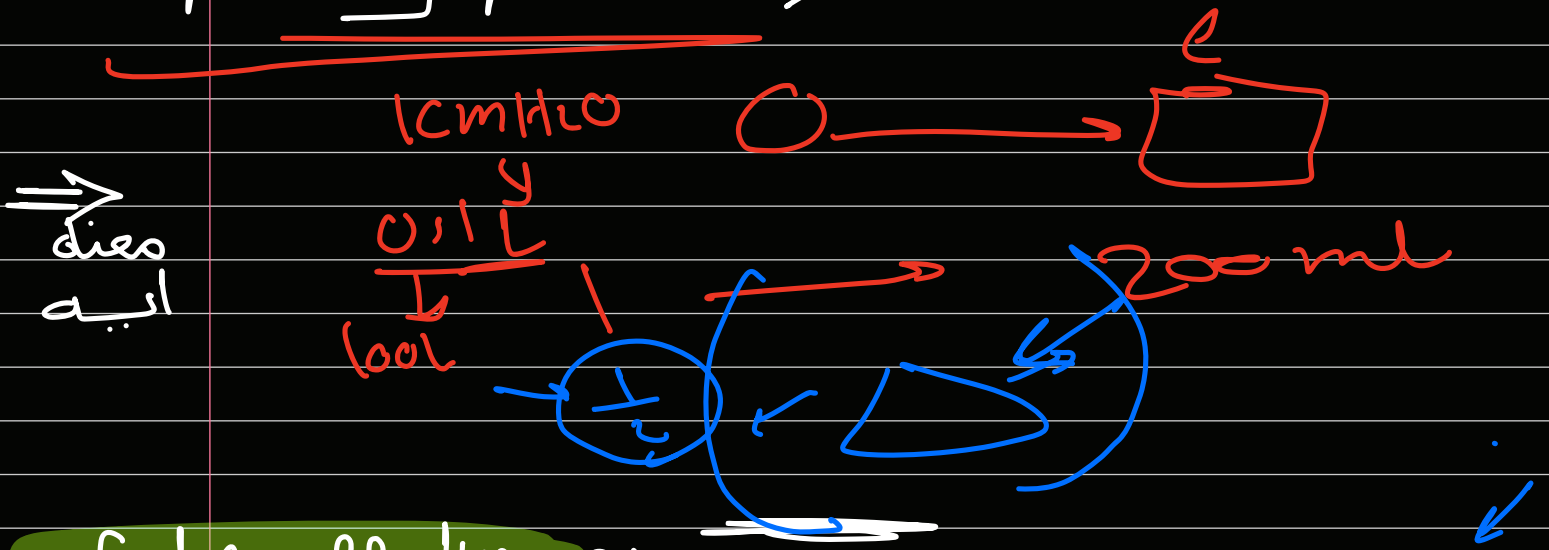
* In normal person →

→ Compliance of lungs alone = 0,2 L/cm H₂O

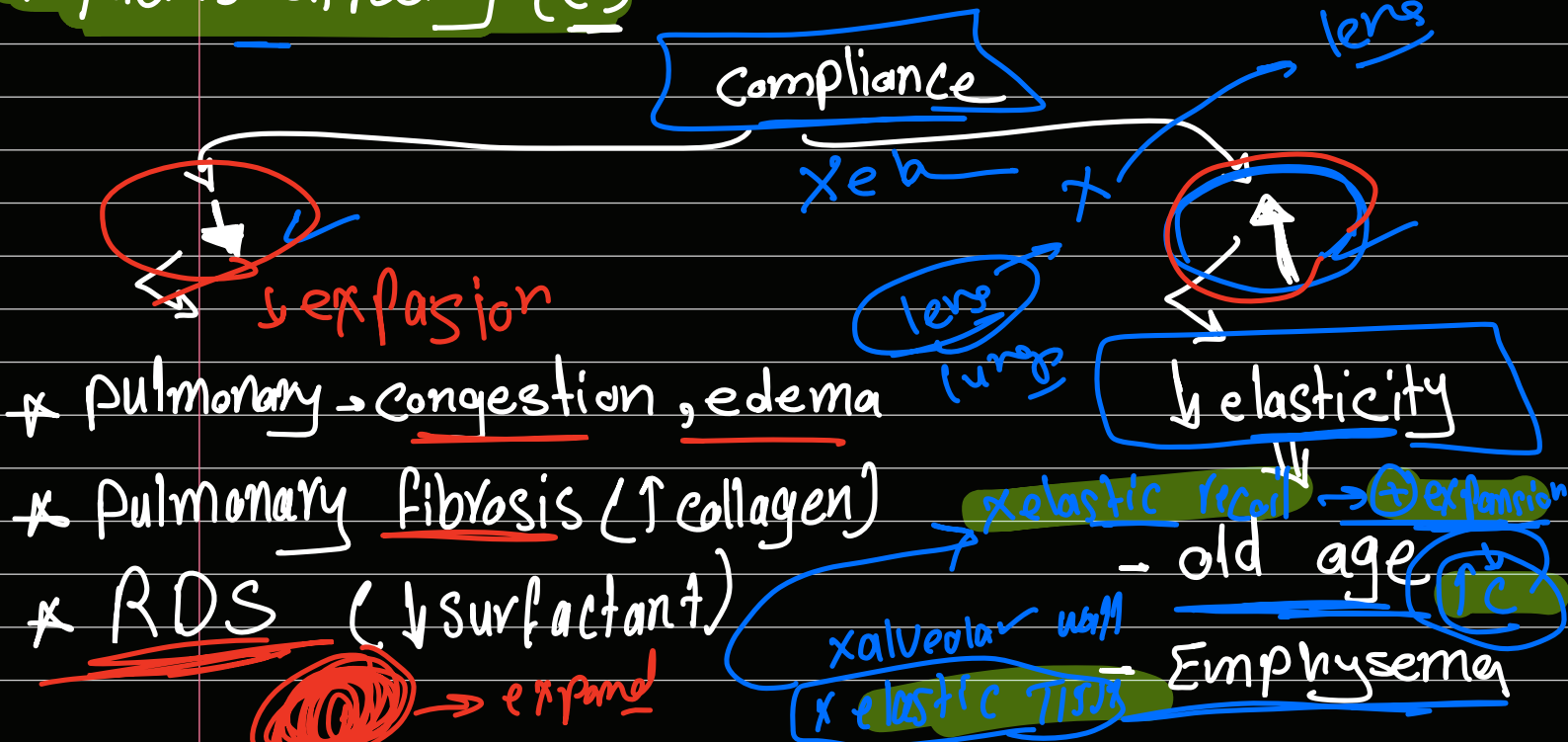
Transpulmonary pressure → 1 cm H₂O → 0,2 L

→ Compliance of chest wall alone → The same.

→ compliance of lung + chest wall → 0,1 L/cm H₂O
transpulmonary pressure ⇒

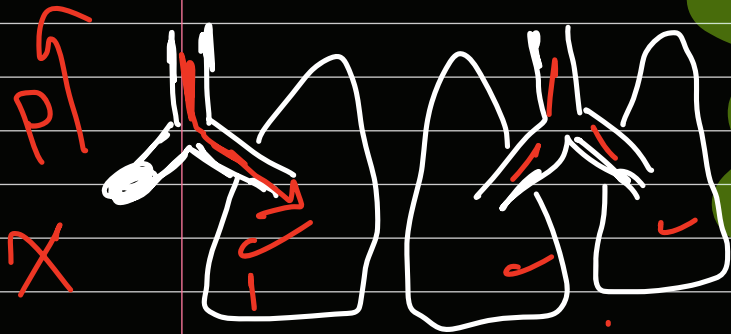


* factors affecting (C)



* pneumonectomy

one lung



- in these condition
↳ less pressure is
needed to inflate
lung

Difficult exp

↳ elastic recoil

XX Passive

↳ forced exp → Abdominal

↳ elastic lateral traction

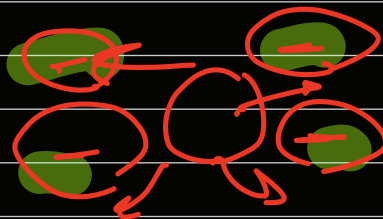
$$C = \frac{\Delta V}{\Delta P}$$

→ in these condition

↳ C → expansio

↳ lung needs more

pressure to be inflated.



elasticity → exp

airway collapse

very Rapid

↑ R

expiration

2

Elastic Recoil

elastic force in lung ::

① of elastic Tissue of the lung ::

elastin and collagen fibers

lung, Thoracic → elastic tissue

recoil to unstretched position

x distending force

② By Alveolar Surface Tension ::

produced → by attractive force

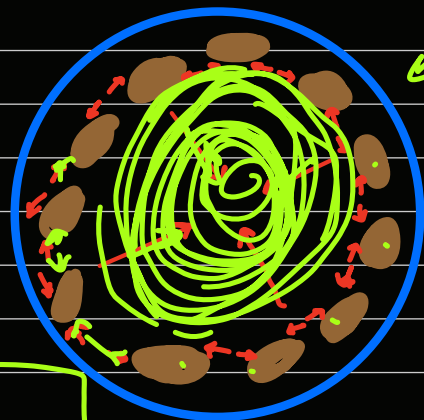
resist inflation

tend ↓

Alveoli to collapse

so ↓

lungs recoil away from chest wall after ins





surfactant

→ surface tension lowering agent

type II Alveolar cells → granular pneumocytes
x air-fluid interface.

lipid

spread on surface of water in Alveoli

Phospholipid, Protein, Calcium

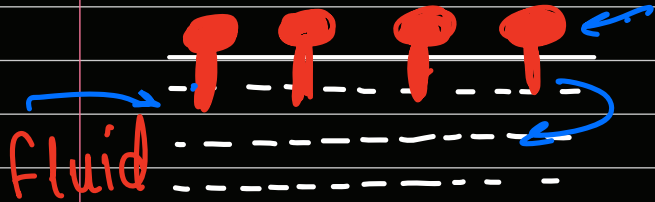
hydrophilic

hydrophobic

Lecithin

air

↑ air



Fluid

fixation

↓ surface tension from 2-10 fold

→ prevent alveolar collapse.

Rapid spread

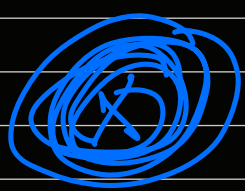


spread

x air
Tension

Function ::

↓ T



① ↑ lung compliance → expansion

→ effort → work of breathing.

② Tendency of Alveoli to recoil → prevent collapse

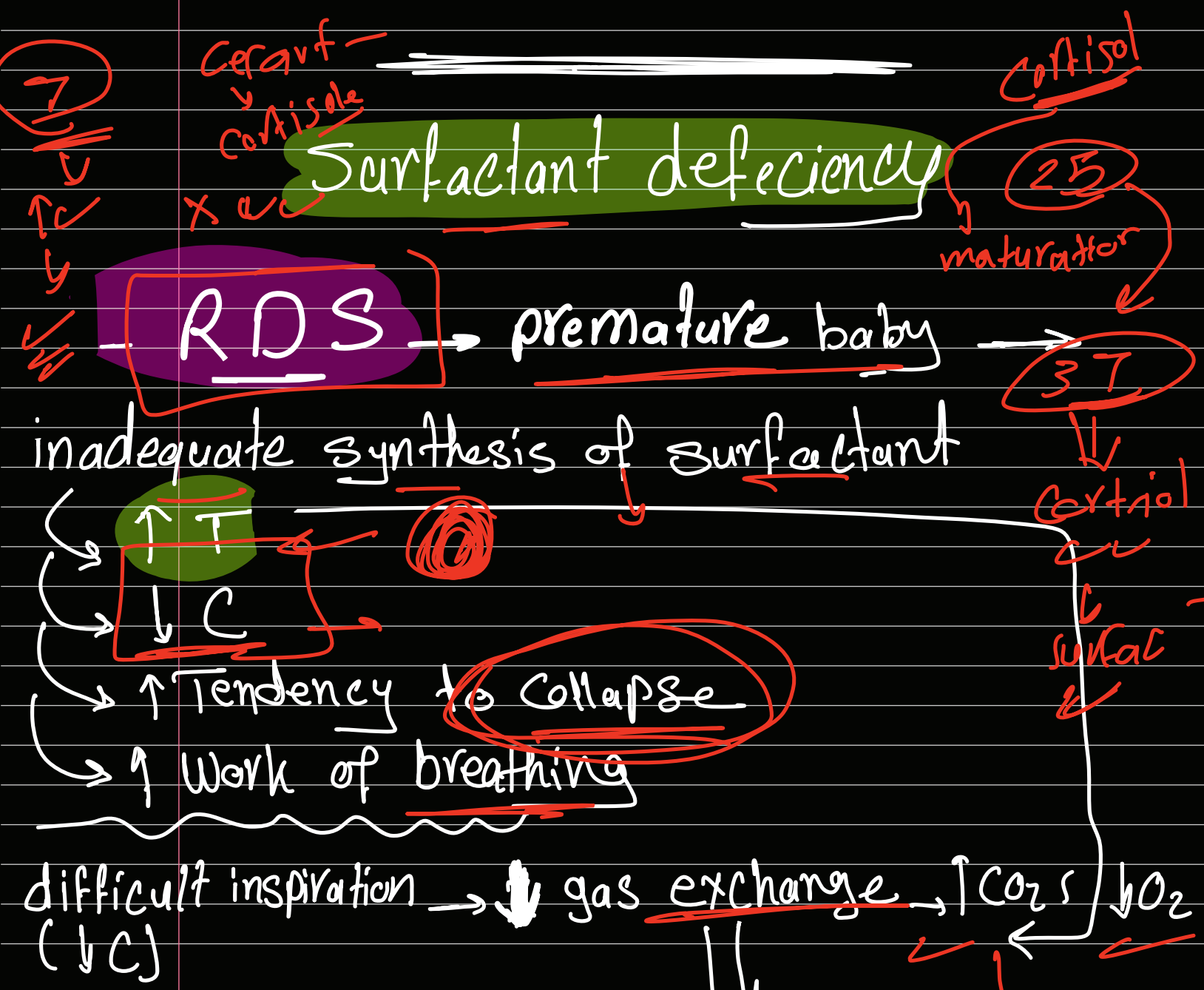
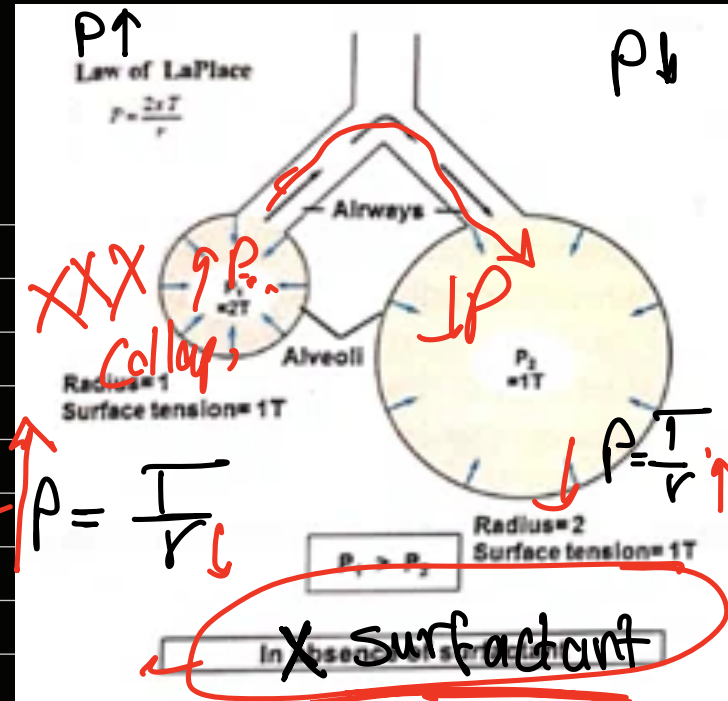
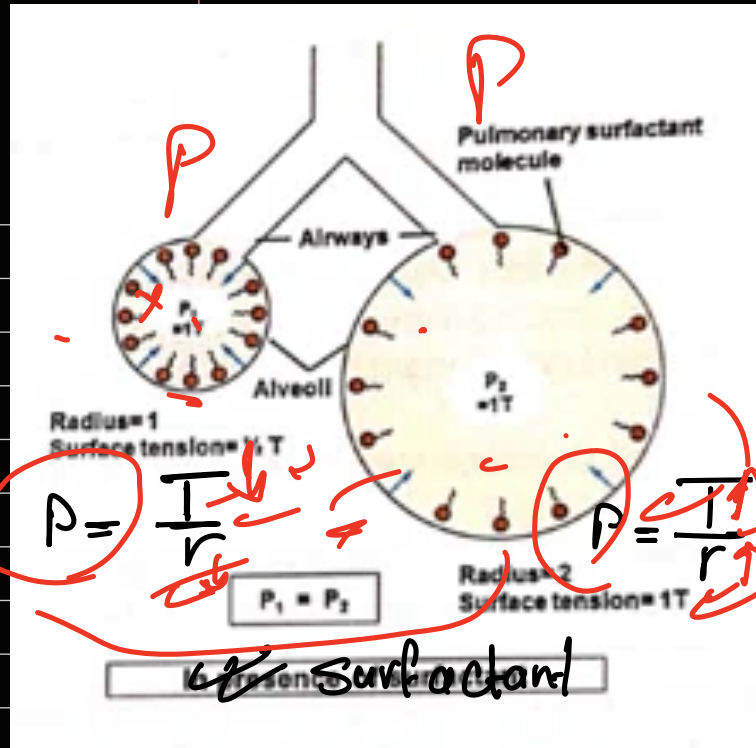
elast
Tension
recoil

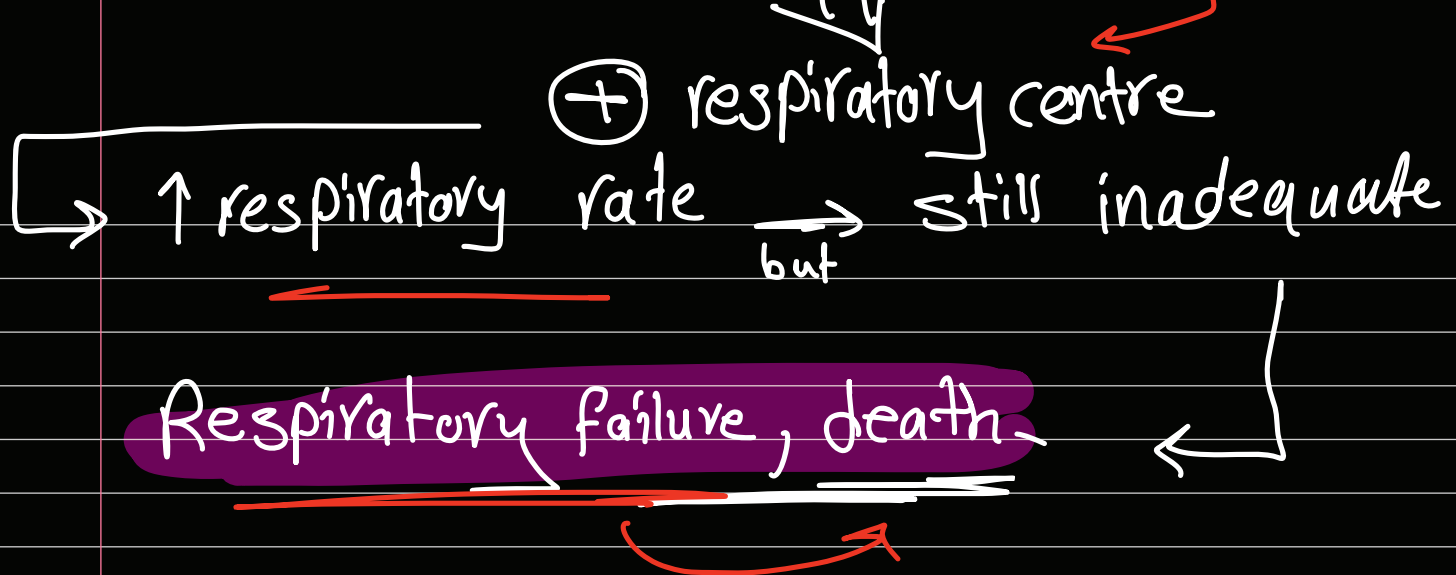
③ - prevent pulmonary edema.



④ - Stabilize size of Alveoli and keep it open.

$$P = \frac{2T}{r}$$





pulmonary edema

surfactant → edema

fluid in alveoli

↳ proteinaceous fluid

Microscope ← hyaline membrane

→ Hyaline membrane disease

IRDS

Manage :: for

* premature infant ::

↓
inhalation of
synthetic surfactant

↓
lessening of RDS.

↓ → colla

↓
Assist ventilation

PEEP

↓
to prevent collapse

* for mother :: Glucocorticoids (cortisol)

✓
↓ premature labor

↪ maturation of surfactant.



Factors $\rightarrow$ collapse

① elastic
Tissue

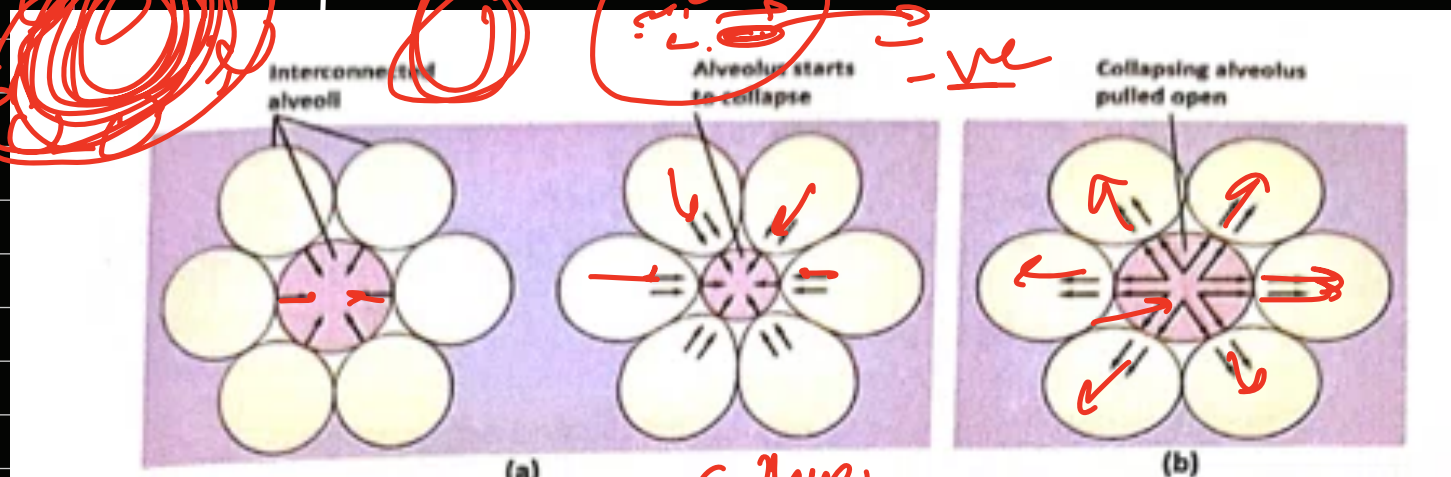
② ^{recoil} surface
Tension

Factors keep alveoli open

① Transmural P across lung.
 $\leftarrow$ distending P.

② surfactant

③ Alveolar interdependance



inter
connected
Alveoli
collapse

keep it
open

